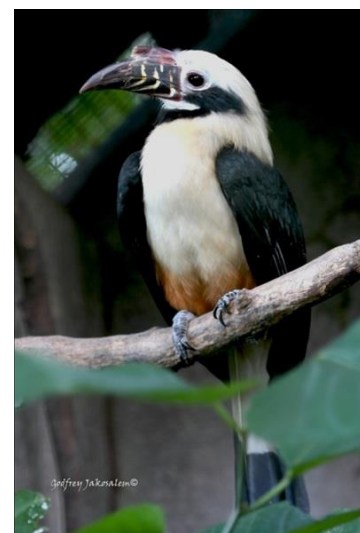




Synchronized Biodiversity Monitoring System and Hornbill Count in Three Protected Areas in Negros Island



Municipality of Sibulan, Negros Oriental



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SUMMARY

A synchronized biodiversity monitoring and hornbill count was conducted in the three terrestrial protected areas in Negros Island: Balinsasayao Twin-Lakes Natural Park (BTLNP), Mt. Kanlaon Natural Park (MKNP) and Northern Negros Natural Park (NNNP) on June 1, June 8 and June 20, 2017 respectively. The purpose of the activity is to conduct biological monitoring as well as count the population of threatened endemic species particularly the Visayan hornbill and the Rufous-headed hornbill. This activity was led primarily by the Department of Environment and Natural Resources in partnership with Philippines Biodiversity Conservation Foundation, Inc., Provincial Environment Management Office of Negros Occidental, different LGUs; Bago City, Murcia, La Carlota City, La Castellana, San Carlos City, Silay City, Talisay City, EB Magalona, Victorias City, Don Salvador Benedicto, Canlaon City, and Sibulan in Negros Oriental.

Standard 2km transect was monitored and permanent monitoring points were established for the next quarterly bio-monitoring and hornbill counts. A total of two 1km transect was established and surveyed in BTLNP which covered a land area of 40 hectares. In MKNP thirteen 2km and four 1km transects were established but only eleven 2km and two 1km transects were surveyed which covered a land area of 500 hectares. The most number of transects were in NNNP, a total of twelve 2km transect, two 1km and 750m transects were established which comprises a total land area of 535 hectares. Birds were recorded and habitat characteristics were obtained.

A total of 71 species of birds were recorded between the three protected areas of which 41 are Philippine endemic eight of which are threatened. In BTLNP, a total of 26 species of birds was recorded, 20 of which are Philippine endemic and six are restricted range species. There are only three threatened species recorded in BTLNP. While in MKNP a total of 55 species was recorded, 33 species are Philippine endemic of which nine are restricted range species and five species are threatened. NNNP had the most number of species recorded, a total of 63 species, 39 species are Philippine endemic and ten restricted range species of which eight are threatened.

The five-restricted range species - White-winged Cuckooshrike *Coracina ostenta*, Grey-breasted Brown Dove *Phapitreron maculipectus*, Visayan Hornbill *Penelopides panini*, Visayan Flowerpecker *Dicaeum haematostictum* and Flame-templed Babbler *Dasycrotapha speciosa* which are all present in the three-terrestrial protected area of Negros were recorded. All of these species were observed and recorded in NNNP. Only four were recorded in MKNP which includes; White-winged Cuckooshrike *C. ostenta*, Visayan Hornbill *P. panini*, Visayan Flowerpecker *D. haematostictum* and Flame-templed Babbler *Dasycrotapha speciosa*. Whereas in BTLNP only three restricted range species of birds were recorded these are the White-winged Cuckooshrike *C. ostenta*, Visayan Hornbill *P. panini* and Visayan Flowerpecker *D. haematostictum*.

One of the world's critically endangered hornbills occurs only in the islands of Negros and Panay-the Rufous-headed Hornbill. It was believed to be extinct in Negros until recent discoveries by PBCFI. During the bio-monitoring and hornbill count, the Rufous-headed hornbill was heard and recorded in Victorias City in NNNP but none in BTLNP and MKNP. This species cannot tolerate disturbed forests while the endangered Visayan Hornbills somehow can. Visayan Hornbills are present in all three protected areas but only one was recorded in BTLNP and MKNP while a total of twenty individuals was recorded in NNNP. Most of the numbers of the Visayan Hornbills recorded were outside the transects. Aside from these findings, the critically endangered Visayan Warty pig marks were observed in MKNP and NNNP and the rare critically endangered Visayan Spotted Deer tracks were only observed in Silay City in NNNP.

The synchronized BMS and hornbill count in the three protected areas was participated by a total of 249 citizen scientists from all over Negros Island. The most represented group was San Carlos City during the MKNP bio-monitoring and hornbill count (38 citizen scientists), Victorias City in NNNP (26 citizen scientists), Canlaon City in MKNP (25 citizen scientists), Murcia in MKNP (22 citizen scientists) and Bago City in MKNP (18 citizen scientists).

The three terrestrial protected areas in Negros cradle some of the most globally threatened species that are found nowhere else, but resources and people available to manage and monitor biodiversity are limited. That is why the Department of Environment and Natural Resources in partnership with the PBCFI and LGUs in Negros Island conducted the first synchronized hornbill count in the three protected areas for the general purpose of generating information and status update on the biodiversity of these sites. Working in partnership with the different sectors of stakeholders such as LGUs and NGOs unifies resources, provides a deeper pool of perspective and expertise and promotes sustainability of the activity. Information generated will then be a significant input towards the better understanding of the species, stronger protection of their habitat and enhanced management of the sites. Working together for a common goal means more resources, manpower, experts to work scientifically and sustainability.

Table 1. Summary result of the synchronized BMS and hornbill count in the three-protected areas in Negros Island

PA	No. of transects	No. of Hectares covered	No. of citizen volunteers/scientists	General characteristics of the habitat	Target Species observed
BTLNP	2	40	22	Secondary forest	3
MKNP	13	500	128	Primary forest, secondary forest, mixed plantation	4
NNNP	14	535	99	secondary forest, mixed plantation	5

INTRODUCTION

Philippines is home to more than 600 species of birds of which close to 50% are endemic to the country (del Hoyo *et al* 2014). Despite the local, national and international efforts directed towards conservation of wildlife, many bird populations particularly restricted-range species, species with a geographically restricted area of distribution, are in dramatic decline. In most cases, this is due to hunting or loss of natural habitats.

The island of Negros is considered as one of the most degraded areas in the Philippines where it ended up listed as the hottest of the global hotspots for biodiversity conservation (Mallari *et. al*, 2000; Collar *et al* 1999). With forest cover reduced to 4% of its land cover largely due to logging in the early 1970's followed by successful sugar cane industry combined with local demands of fuel wood for mills, railways, household need (Heaney *et al*, 1998; Turner *et al.*, 2001; Paguntalan 2003). Consequently, these threatened the biodiversity of Negros Island.

Based on the initial results of previously conducted studies, majority of the threatened, endemic wildlife is distributed in forest fragments that are widely separated from each other and are under enormous pressure of disappearing. With the uniqueness of the biodiversity of Negros Island the government prompted to declare several key important forests as national parks e.g. Balinsasayao Twin-Lakes Natural Park (BTLNP), Mt. Kanlaon Natural Park (MKNP) and the Northern Negros Natural Park (NNNP) under the Republic Act 8576 or the National Integrated Protected Area System. The three Protected Areas were selected on the basis of the extent of forest cover particularly remaining lowland forests; number of threatened and endemic species including the presence of restricted-range species and the presence of existing management structures and biodiversity agenda.

Despite this, information on biodiversity is still scanty, fragmented and recent updates provided are localized to areas with existing projects and information on science is limited to checklists of threatened species and science needs to be translated into practical terms to facilitate increase support for environmental governance. The bio-monitoring activity was conducted quarterly to update the biological information of the three protected areas in Negros Island. It was designed for wildlife monitoring through wildlife identification techniques in accordance for biodiversity monitoring system.

OBJECTIVES

The Biodiversity Monitoring System aims to improve the biological baseline information available for decision-makers in protected areas through the regular collecting of data on natural biological resources. The specific aims of this bio-monitoring were to:

- To facilitate the conduct of bio-monitoring in the three protected areas
- To come up with an island wide population estimate of threatened species particularly the hornbills

METHODS

Site Description

Balinsasayao Twin-Lakes Natural Park

Balinsasayao Twin-Lakes Natural Park (BTLNP) is located in Negros Oriental and covers an area of 8,000 ha which is rich in biodiversity that is only unique in the island. The survey was conducted in Mt. Guinsayawan, Sitio Calinawan, Barangay. Enrique Villanueva, Sibulan on June 1, 2017. Mt. The survey site is part of the protected area just behind the twin lakes which still contains significant forest cover of remaining logged-over forest that recovered into mature secondary forest. There are some emergent trees observed and recorded in the area which is close to 20 meters tall with Lauan species dominating the canopy.



Figure1. Forest territory of Mt. Guinsayawan in Balinsasayao Twin-Lakes Natural Park. *Photo by: Andrew Ross Reintar*

Mt. Kanlaon Natural Park

Mt. Kanlaon Natural Park (MKNP) is the highest peak in Negros island located 35km Southeast of Bacolod City (Mallari, 2001). The park is known to harbor significant biodiversity and covers a total land area of 24,557.6 hectares. Municipalities of Murcia and La Castellana and cities of Bago, La Carlota, San Carlos in Negros Occidental and Canlaon City in Negros Oriental comprises Mt. Kanlaon Natural Park. Primary forests are located in elevations 1000-1500masl where there were less visible signs of human activities. While the secondary forests are in

lower elevations from 800 to 1100masl which had re-grown after major disturbances from recent years. Plantation and mixed forest.



Figure 2. Mid-montane forest of Mt. Kanlaon Natural Park. *Photo by: Lisa Paguntalan*

Northern Negros Natural Park

The Northern Negros Natural Park (NNNP), formerly known as Northern Negros Forest Reserve (NNFR) was considered as the largest remaining forest in Negros Island and is home to numerous species of flora and fauna extending across the cities of Talisay, Silay, Victorias, Cadiz, Sagay and San Carlos, and municipalities of E.B. Magalona, Murcia, Toboso, Calatrava and Don Salvador Benedicto. The park covers an aggregate area of 80,454.50 ha and was dominated with different dipterocarp trees including Almaciga species and Lauan species. Primary forests are concentrated on higher elevations and bordered by secondary forests on the lower elevations.

The biodiversity monitoring in NNNP was conducted on June 20, 2017 in cities of Talisay, Silay, Victorias and San Carlos and municipalities of EB Magalona, Murcia and Don Salvador Benedicto. The monitoring was canceled in areas of Cadiz, Sagay, Calatrava and Toboso due to safety precautions.

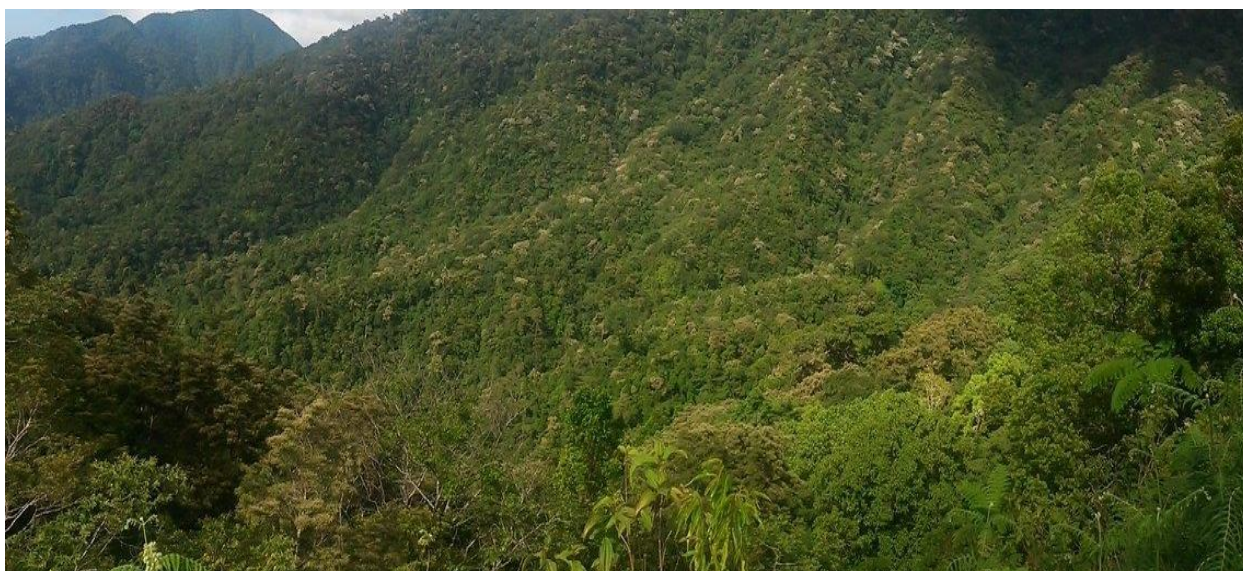


Figure 3. Panoramic view of the extensive forests of Northern Negros Natural Park. *Photo by: Lisa Paguntalan*

Transect Establishment

Standard 2km transect was established among the identified location sites in the three protected areas where important species occur with intact natural habitats in the multiple use and strict protection zones. The standard Biodiversity Monitoring System Manual for Protected Areas by NORDECO and Department of Environment and Natural Resources (NORDECO and DENR, 2001) was followed. The transect was divided into nine points and was measured 250m apart including the starting and the end points. Each point was marked permanently using spray-paints and enamel paints. A Global Positioning System (GPS) was used to record the elevation and the coordinates of every points being marked.

Balinsasayao-Twin Lakes Natural Park

In Balinsasayao Twin-Lakes Natural Park, the team conducted the survey in Mt. Guinsayawan- still a part of the protected area specifically in Sitio Calinawan, Barangay Enrique Villanueva, Sibulan where the biological baseline information for birds in this area is scarce. The two teams established a 1km transect line each because of the discontinuous forest.

Table 2. Established permanent monitoring trails in Balinsasayao Twin Lakes Natural Park.

Municipality	Barangay	Code Description	Transect Covered (km)
Sibulan	Sitio Calinawan, Barangay Enrique Villanueva	Naupak Trail (EV)	1
	Sitio Calinawan, Barangay Enrique Villanueva	Naupak Trail	1

Mt. Kanlaon Natural Park

On the other hand, a total of thirteen 2km transect and four 1km transect was established in the six municipalities and cities within Mt. Kanlaon Natural Park. The establishment of

transects in this area was conducted before the actual bio-monitoring and with that the elevation and coordinates of each bio-monitoring trails were obtained.

Table 3. Established permanent monitoring trails in Mt. Kanlaon Natural Park.

Northern Negros Natural Park

In Northern Negros Natural Park, the establishment of transects were simultaneously

Municipality/City	Barangay	Code Description	Transect Covered (km)
Bago City	Sitio Pataan, Barangay Mailum	EDC Roadside (E)	2
	Sitio Pataan, Barangay Mailum	Maragandang Trail (H)	2
	Sitio Pataan, Barangay Mailum	Camp Shelter Trail (C)	2
	Sitio Pataan, Barangay Mailum	Camp Shelter Additional Trail (C)	1
	Sitio Katugasan, Barangay Mailum	Katugasan Trail (K)	1
Murcia	Sitio Gayas, Barangay Minoyan	Ranger Station Trail (R)	2
	Sitio Gayas, Barangay Minoyan	Wasay Trail (W)	2
La Carlota City	Sitio Guintubdan, Barangay Aral	Guintubdan Trail G	2
La Castellana	Barangay Cabagnaan	Cabagnaan Trail (L)	1
	Barangay Sag-ang	Sag-ang Trail (N)	2
San Carlos City	Sitio Cabagtasán – Sitio Nagalaw, Barangay Cudcod	Iliranan Trail (N)	2
	Sitio Cabagtasán, Barangay Cudcod	Apog-apog Trail (A)	2
	Sitio Cabagtasán, Barangay Cudcod	Manogbo Trail (M)	1
	Sitio Cabagtasán – Sitio Natuyay, Barangay Cudcod	RCPI Trail (R)	2
	Sitio Natuyay – Sitio Bedjo, Barangay Cudcod	Natuyay Trail (D)	2
Canlaon City	Sitio Maput, Barangay Pula	Maput Trail (M)	2
	Sitio Manibungtod, Barangay Manibungtod	Manibungtod Trail (M)	2

conducted in all identified areas during the actual bio-monitoring. A total of twelve 2 kilometer transect, two 1km transect and one 750m transect was established in chosen important areas for patrolling and bio-monitoring in NNNP. Victorias City had the most number of transects since these transects were already established in the area long before the synchronized hornbill count was conducted.

Table 4. Established permanent monitoring trails in Northern Negros Natural Park.

Municipality/City	Barangay	Code Description	Transect Covered (km)
Talisay City			2
Silay City	Barangay Patag	Cuyong Trail (C)	2
	Barangay Patag	Pinetree Trail (P)	2
	Barangay Patag	Lantawan Trail (L)	2
EB Magalona	Barangay Canlusong	Canlusong Trail (H)	2
Victorias City	Barangay Gawahon	Dinamlagan Trail	2
	Barangay Gawahon	Dinamlagan Trail	2
	Barangay Gawahon	Ubak Trail 1	2
	Barangay Gawahon	Ubak Trail 2	2
	Barangay Gawahon	Waterfalls Trail	2
Murcia	Barangay Canlandog	Canlandog Trail	2
Don Salvador Benedicto	Barangay Igmayaan	Dayo Trail 1 (D)	2
	Barangay Igmayaan	Dayo Trail 2 (D)	1
San Carlos City	Barangay Bagonbon	Inutusan Trail (I)	1
	Barangay Palamban	Alinsayawan Trail (A)	0.75



Figures 4-6. Point 750 marked permanently in Balinsasayao Twin-Lakes Natural Park (A); Actual establishment of permanent marker for BMS in San Carlos City in Mt. Kanlaon Natural Park (B) and Permanent monitoring point for BMS in Don Salvador Benedicto in Northern Negros Natural Park. *Photos by: Andrew Ross Reintar and Erl Pfan Maglangit*

Orientation to Volunteers

The participants were given orientations before the conduct of the synchronized BMS and hornbill count. Orientations were conducted to inform the volunteers particularly those who were not trained during the BMS training workshop on the background of the activity, the do's and don'ts inside a protected area, methods of the survey, safety and the importance of doing the activity.

Field Techniques

A combination of point count and transect walk method was used to survey for birds. Standard 2 km transects were established following established trails. Point stations for point count were established at every 250m of each transect. Point transect starts between 06:00 – 06:30 and ends between 09:30 – 10:00. Observers walk to each point and record birds seen and heard. Information recorded includes species name, number of individuals per species, distance of the bird from the trail and behaviour of the species. A total of 2kms transect was established in Mt. Guinsayawan in Balinsasayao Twin-Lakes Natural Park (Table 5), 25kms transect was established Mt. Kanlaon Natural Park (Table 6) and 26.75kms transect in Northern Negros Natural Park (Table 7). Identification of the bird species was attained through the use of the field guide 'A guide to the Birds of the Philippines' by Kennedy *et al.* 2000 where the taxonomic order of this publication is followed.

Table 5. Total area surveyed in Balinsasayao Twin Lakes Natural Park.

	Mt. Guinsayawan, Sitio Calinawan, Barangay Enrique Villanueva, Sibulan		TOTAL
	Naupak 1	Naupak 2	
In kilometers (km)	1	1	2km
In hectares (ha)	20	20	40ha

Table 6. Total area surveyed in each municipalities and cities within Mt. Kanlaon Natural Park.

	Bago City	Murcia	La Carlota City	La Castellana	Canlaon City	San Carlos City	TOTAL
In kilometers (km)	5	4	2	1	4	9	25km
In hectares (ha)	100	80	40	20	80	180	500ha

Table 7. Total area surveyed in each municipalities and cities within Northern Negros Natural Park.

	Talisa y City	Silay City	EB Magalona	Victoria s City	Murci a	DS Benedict o	San Carlos City	TOTAL
In kilometers (km)	2	6	2	10	2	3	1.75	26.75km
In hectares (ha)	40	120	40	200	40	60	35	535ha

Habitat Characteristics Assessment

Habitat characteristics of each point were acquired and assessed under ten habitat variables (tree height 10-15m, >15m and >20m, tree density, canopy cover, understory cover, understory height, distance to clearing, presence of flowering tree species, presence of

fruiting tree species and presence of tree cavities). A 30 x 30-meter square plot was used for habitat characterization and it was divided into four quadrants to facilitate the ease of acquisition. The category of tree heights was chosen as it was the tree stratification structure observed in the forests of Negros specifically in Balinsasayao Twin-Lakes Natural Park, Mt. Kanlaon Natural Park and Northern Negros Natural Park.

RESULTS

Balinsasayao Twin-Lakes Natural Park

A total of 26 species belonging to 18 families of birds were recorded in Sitio Calinawan, Barangay. Enrique Villanueva, Sibulan. The Mountain White-eye *Zosterops montanus* (13.9%) was the most abundant species. It was followed by Philippine endemic species Philippine Cuckoo Dove *Macropygia tenuirostris* (12.5%) and Orange-bellied Flowerpecker *Dicaeum trigonostigma* (9.7%).

We also recorded a total of 20 Philippine endemic species of birds within the area including the eight restricted range species; Visayan Bulbul *Hypsipetes guimarasensis* (4.2%), Chestnut-crowned Tailorbird *Orthotomus castaneiceps* (1.4%), Visayan Shama *Kittacincla superciliaris* (1.4%), Visayan Cuckooshrike *Coracina panayensis* (2.8%), the threatened White-winged Cuckooshrike *Coracina ostenta* (4.2%), Visayan Fantail *Rhipidura albiventris* (1.4%) and Visayan Flowerpecker *Dicaeum haematostictum* (6.9%) and the endangered Visayan Hornbill *Penelopides panini* (1.4%). Only three species recorded were included in the IUCN threatened species (Table 8).

Table 8. List of threatened species of birds recorded in Mt. Guinsayawan in Balinsasayao Twin-Lakes

SPECIES	TOTAL
White-winged cuckoo shrike <i>Coracina ostenta</i> *	3 (4.2)
Visayan Hornbill <i>Penelopides panini</i> **	1 (1.4)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **	5 (6.9)

Natural Park. Note: *Vulnerable; **Endangered

The establishment of transects and the actual bio-monitoring and habitat assessment in Balinsasayao Twin-Lakes Natural Park was participated by 22 citizen scientists-volunteers from different groups, organizations, DENR offices and institutions. CUFAII Peoples' organization garnered the most number of volunteers during the conduct of the bio-monitoring and hornbill count (Table 9).

Table 9. Citizen scientists from different groups volunteered during the actual bio-monitoring in Balinsasayao Twin-Lakes Natural Park.

Office/Group/Organization	No. of Participants
DENR-CENRO Dumaguete	3
DENR-CENRO Ayungon	1
PO Volunteers	11
Siliman University Volunteers	2

PBCFI Staff	5
TOTAL	22



Figures 7 and 8. Citizen scientists of Balinsasayao Twin-Lakes Natural Park, team 1 (left) and team 2 (right).

Photos by: Aladin Bucol and Erl Pfan Maglangit

Mt. Kanlaon Natural Park

A total of 55 species of birds belonging to 28 families were recorded in the six Local Government Units surveyed in Mt. Kanlaon Natural Park. Thirteen transects were established and surveyed. The most abundant species recorded were the Mountain White-eye *Z. montanus* (25.4%), Visayan Bulbul *H. guimarasensis* (8.7%) and Yellowish White-eye *Z. nigrorum* (7.2%). There were a number of bird species expected to occur within the park that were not encountered during the survey. At the time of the survey, the Visayas experienced a tropical depression which induced heavy rains and fogs limiting the opportunity to observe birds.

There were 33 Philippine endemic species of birds recorded, nine of these are known only to occur in West Visayas faunal region these includes; White-winged Cuckooshrike *C. ostenta* (0.3%), Visayan Cuckooshrike *C. panayensis* (1.7%), Visayan Hornbill *P. panini* (0.2%), Visayan Bulbul *H. guimarasensis* (8.7%), Chestnut-crowned Tailorbird *O. castaneiceps* (3.0%), Visayan Shama *K. superciliaris* (2.3%), White-throated Jungle Flycatcher *R. albigularis* (0.2%), Visayan Flowerpecker *D. haematostictum* (0.6%), Flame-templed Babbler *D. speciosa* (0.5%).

Table 10. List of threatened species of birds recorded in six LGU's of MKNP. Note: *Vulnerable; **Endangered

SPECIES	BC	M	LCC	LC	SCC	CC	TOTAL
White-winged cuckoo shrike <i>Coracina ostenta</i> *	+				2 (1.3)		2 (0.3)
Visayan Hornbill <i>Penelopides panini</i> **		+		1			1 (0.2)

White-throated Jungle Flycatcher <i>Rhinomyias albigularis</i> **		1 (1.3)					1 (0.2)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **	2 (2.5)	1 (1.3)				1 (0.4)	4 (0.6)
Flame-templed Babbler <i>Dasycrotapha speciosa</i> **		3 (3.9)					3 (0.5)

Legend: BC-Bago City; M-Murcia; LCC-La Carlota City; LC-La Castellana; SCC-San Carlos City; CC-Canlaon City

The synchronized bio-monitoring and hornbill count in Mt. Kanlaon Natural Park was participated by 128 citizen scientists from different groups and organizations (Table 11). The most number of volunteers in all cities and municipalities were from the Mt. Kanlaon Green Brigade (MKGB) and the Department of Environment and Natural Resources (DENR) personnels. San Carlos City had the most number of volunteers during the synchronized BMS and hornbill count since there were four transects established in the area.

Table 11. Citizen scientists from different groups volunteered during the actual bio-monitoring in MKNP.

Office/Group/Organization	Bago City	Murcia	La Carlota City	La Castellana	Canlaon City	San Carlos City	TOTAL
DENR PENRO	2				3		5
DENR-CENRO Bago	2	4	3	3			12
DENR-CENRO Cadiz						3	3
DENR-CENRO Kabankalan			1				1
LGU-ENRO Staff	2				3	2	7
Mt. Kanlaon Green Brigade	7	6	11	4	17	31	76
Talarak Foundation		2					2
Earthguards	1	7					8
LC Outdoors				2			2
Student Volunteers	2	2				1	5
PBCFI Staff	2	1		1	2	1	7
TOTAL	18	22	15	10	25	38	128



Figures 9-16. Citizen scientists of Mt. Kanlaon Natural Park. (A) Bago City, (B and C) Murcia, (D) La Castellana, (E and F) Canlaon City and (G) San Carlos City.

Northern Negros Natural Park

A total of 14 transects was established and surveyed in seven political jurisdictions of NNNP. Sixty-three species of birds from twenty-seven families were recorded in the area. The Visayan Bulbul *H. guimarasensis* (16.3%) was the most abundant followed by the Mountain White-eye *Z. montanus* (8.6%) and the Yellowish White-eye *Z. nigrorum* (5.7%). There were about 39 Philippine endemic species of which 13 of these were restricted in West Visayas only, the species includes; Visayan Shama *K. superciliaris*, Chestnut-crowned Tailorbird *O. castaneiceps*, Visayan Bulbul *H. guimarasensis*, Visayan Cuckooshrike *C. panayensis*, near-threatened Grey-breasted Brown Dove *P. amethystinus*, the vulnerable White-winged Cuckooshrike *C. ostenta* and Visayan Flowerpecker *D. haematostictum*, the endangered Visayan Hornbill *P. panini*, White-throated Jungle Flycatcher *R. albigularis*, Flame-templed Babbler *D. speciosa* and Yellow-faced Flameback *C. xanthocephalus* and one of the most threatened hornbills in the world-the Rufous-headed Hornbill *R. waldeni*.

A total of eight threatened species of birds were recorded in NNNP (Table 12) and most of these were recorded in Victorias City. There were no threatened species of birds recorded in Talisay City and San Carlos City.

Table 12. List of threatened species of birds recorded in seven LGU's of Northern Negros Natural Park.
Note: *Vulnerable; **Endangered, ***Critically Endangered; Nt – Near threatened

SPECIES	TC	SC	EBM	VC	M	DSB	SCC	TOTAL
Grey-breasted Brown Dove <i>Phapitreron amethystinus</i> NT				1 (0.2)				1 (0.09)
White-winged cuckoo shrike <i>Coracina ostenta</i> *				4 (0.9)		9 (5.5)		13 (1.2)
Visayan Hornbill <i>Penelopides panini</i> **		1 (0.8)	3 (4.9)	11 (2.6)	2 (1.3)	3 (1.8)		20 (1.8)
Rufous-headed Hornbill <i>Rhabdorrhinus waldeni</i> ***				+				+
White-throated Jungle Flycatcher <i>Rhinomyias albigularis</i> **		4 (3.0)	1 (1.6)	35 (8.2)	7 (4.5)	4 (2.4)		51 (4.7)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **		2 (1.5)	2 (3.3)	8 (1.9)	4 (2.6)	1 (0.6)		17 (1.6)
Yellow-faced Flameback <i>Chrysocolaptes xanthocephalus</i> **				1 (0.2)				1 (0.09)
Flame-templed Babbler <i>Dasycrotapha speciosa</i> **				1 (0.2)	3 (1.9)			4 (0.4)

Legend: TC-Talisay City; SC-Silay City; EBM-E.B. Magalona; VC-Victorias City; M-Murcia; DSB-Don Salvador Benedicto; SCC-San Carlos City

The Endangered Visayan Hornbill is a lowland specialist and had been recorded in the park and other parts of Negros Island. This species was recorded in Silay City, E. B. Magalona, Victorias City, Murcia and Don Salvador Benedicto. The hornbill was most abundant in Victorias City and was absent in Talisay City and San Carlos City. A total of thirty-three (33) Visayan Hornbills were recorded during the survey. The whole team traversed 26.75 km about 535 hectares. The estimated population density of this species is 33 individuals per 535 hectares since the activity was done simultaneously in different sites in NNNP at the same time. Also, the critically endangered Rufous-headed Hornbill was recorded in forests of Victorias City which was believed to harbor the needed requirements for this sensitive species.

Table 13. Visayan Hornbill observed in seven LGU's of NNNP within and outside points.

	Talisay City	Silay City	EB Magalona	Victorias City	Murcia	DS Benedicto	San Carlos City	TOTAL
Within Points	0	1	3	11	2	3	0	20
Outside Points	0	3	2	7	1	2	0	13
TOTAL	0	4	5	18	3	5	0	33

The establishment of transects and the synchronized BMS and hornbill count in Northern Negros Natural Park was participated by ninety-nine (99) citizen scientists from different groups and organizations (Table 14). Bantay Bukid Brigade from the different cities and municipalities except in Don Salvador Benedicto dominated the count and Victorias City had the most number of volunteers since the area already had five established transects.

Table 14. Citizen scientists from different groups volunteered during the actual bio-monitoring in Mt. Kanlaon Natural Park.

Office/Group/Organization	Talisay City	Silay City	EB Magalona	Victorias City	Murcia	DS Benedicto	San Carlos City	TOTAL
DENR PENRO Staff	2			1	1	3		7
DENR-CENRO Cadiz Staff				2			5	7
PEMO Staff						1		1
LGU-ENRO Staff		1		1				2
Bantay Bukid Brigade	10	8	11	9	8		12	58
Talarak Foundation		2						2
Gawahon Ecopark Staff				2				2
Born to be Wild Staff				4				4
PNP				2				2

Volunteers			1	3	2	2		8
PBCFI Staff		1	1	2	1	1		6
TOTAL	12	12	13	26	12	7	17	99



Figures 17-21. Citizen scientists of Northern Negros Natural Park. (A) Silay Team, (B) EB Magalona Team, (C) Victorias City, (D) Don Salvador Benedicto and (E) San Carlos City.

Comparison of Number of Species, Threatened and Restricted-range Birds

There were a number of threatened and restricted range species of birds observed during the survey in the three protected areas in Negros Island. All of the threatened species and restricted-range species of birds observed (Table 15) were recorded in Northern Negros Natural Park which includes the critically endangered Rufous-headed Hornbill. Ten of the threatened species observed were recorded in MKNP and eight of the species were recorded in BTLNP while all thirteen were recorded and observed in NNNP.

Table 15. Comparison of the number of restricted-range and threatened species recorded in the three protected areas surveyed. Note: *Vulnerable; **Endangered, ***Critically Endangered; Nt – Near threatened

SPECIES	BTLNP	MKNP	NNNP
Visayan Hornbill <i>Penelopides panini</i> **	1	1	20
Rufous-headed Hornbill <i>Rhabdotorrhinus waldeni</i> ***			+
White-winged Cuckooshrike <i>Coracina ostenta</i> *	3	2	13
Grey-breasted brown dove <i>Phapitreron maculipectus</i> NT			1
Visayan flowerpecker <i>Dicaeum haematostictum</i> **	5	4	17
Flame-templed babbler <i>Dasycrotapha speciose</i> **		3	4
Yellow-faced Flameback <i>Chrysocolaptes xanthocephalus</i> **			1
White-throated jungle flycatcher <i>Rhynomyias albigularis</i> **		1	51
Visayan Cuckooshrike <i>Coracina panayensis</i>	2	11	32
Visayan bulbul <i>Ixus guimarasensis</i>	3	56	178
Visayan Shama <i>Kittacincla superciliaris</i>	1	15	21
Visayan Fantail <i>Rhipidura albiventris</i>	1	25	51
Chestnut-crowned Tailorbird <i>Orthotomus castaneiceps</i>	1	19	38
Total number of species	8	10	13

Visayan Hornbill *Penelopides panini* is endemic to Negros and Panay. This hornbill is categorized as Endangered by the International Union for Conservation of Nature. It inhabits lowland primary forest and nests in tall trees. Visayan Hornbill is recorded in BTLNP, MKNP NNNP and other forest fragments in Negros Island.



Figures 23. Visayan Hornbill *Penelopides panini*
Photo by: Godfrey Jakosalem



Figure 24. Grey-breasted Brown Dove *Phapitreron maculipectus* Photo by: Onie Espina

Grey-breasted Brown Dove *Phapitreron maculipectus* is a restricted range species of Negros and Panay. This newly-split dove may have a small population, which is believed to be declining because of the widespread, ongoing habitat loss and degradation. It is categorized as Near-threatened by the IUCN but population of this species needs updating. This species was heard in Northern Negros Natural Park in Victorias City during the first synchronized BMS and hornbill count.

Visayan Flowerpecker *Dicaeum haematostictum* is endemic to Western Visayas. This species thrives in some of the remaining forests in Negros Island. This species is listed as vulnerable because its population is believed to have declined rapidly as a result of extensive forest clearance. It was recorded in all of the three protected areas surveyed during the hornbill count.



Figure 25. Visayan Flowerpecker *Phapitreron maculipectus*
Photo by: Godfrey Jakosalem

White-winged Cuckooshrike is endemic to the Western Visayas, where it is known from Panay, Negros and Guimaras. Listed as vulnerable by the IUCN because this species is undergoing a rapid and continuing population decline as a result of extensive forest loss at low to mid-altitudes within its range. Recorded in all three protected areas in Negros Island.



Figure 25. White-winged Cuckooshrike *Coracina ostenta* Photo by: Ramon Quisumbing

Flame-templed Babbler *Dasycrotapha speciosa* is endemic to the islands of Negros and Panay. It was formerly fairly common in Mt. Kanlaon Natural Park but is now generally uncommon and declining. It was listed as endangered by the IUCN. This species is recorded in NNNP and MKNP during the hornbill count.



Figures 26. Flame-templed Babbler *D. speciose*. Photo by: Kieron Tan

The critically endangered Visayan Warty Pig marks were also recorded during the survey. There were some Visayan Warty Pig marks observed in Mt. Kanlaon Natural Park (Table 16) but none in Balinsasayao Twin-Lakes Natural Park. While the critically endangered Visayan Spotted Deer appear to be extremely rare with only indications of left marks indicating their presence in the area. In Northern Negros Natural Park, both marks of the Visayan Warty Pig and Visayan Spotted Deer were observed (Table 17). Palm Civet scats were also observed in MKNP and NNNP.



Figures 31 and 32. Tracks of the critically endangered Visayan Warty Pig in NNNP (Left) and fresh scat of the Palm Civet in MKNP (Right).

Photos by: Gerrie Mae Flores

Table 16. Comparison of estimated number of tracks of Visayan Warty Pig in Mt. Kanlaon Natural Park

	Bago City	Murcia	La Carlota City	La Castellana	Canlaon City	San Carlos City	TOTAL
Visayan Warty Pig	1	--	--	--	1	--	3

Table 17. Comparison of estimated number of tracks of Visayan Warty Pig and Visayan (Philippine) Spotted Deer in Northern Negros Natural Park

	Talisay City	Silay City	EB Magalona	Victorias City	Murcia	DS Benedicto	San Carlos City	TOTAL
Visayan Warty Pig	1	14	--	8	1	--	--	24
Visayan Spotted Deer	--	1	--	2	--	--	--	3

DISCUSSIONS

Biological and Ecological Importance of the Three Protected Areas in Negros Island

Negros Island records a total of 41 globally threatened species including 9 critically endangered; 11 endangered species and 21 vulnerable species. The island is home to 16 restricted range species of birds including the IUCN critically endangered Rufous Headed Hornbill (BirdLife and IUCN 2017). There are five restricted range species of birds that are present in Balinsasayao Twin-Lakes Natural Park, Mt. Kanlaon Natural Park and Northern Negros Natural Park. These five restricted range species are White-winged Cuckooshrike, Grey-breasted Brown Dove, Visayan Hornbill, Visayan Flowerpecker and Flame-templed Babbler. All of these species are identified as threatened by IUCN and need immediate action to avoid extinction.

Balinsasayao Twin-Lakes Natural Park

During the actual BMS in BTLNP, there were only three restricted range species of birds (White-winged Cuckooshrike, Visayan Hornbill and Visayan Flowerpecker) recorded due to the fact that the team only managed to assess a 2km transect and the site identified was a

logged-over forest years ago and is slowly maturing into a secondary forest. It is highly important to monitor the species of birds in Mt. Guintubdan specifically in Sitio Calinawan in Brgy. Enrique Villanueva since baseline information in this area is still scanty. Mt. Guintubdan is also adjacent to forests of Sta. Catalina where primary forests are still existing and Visayan Hornbills' population is high.

Mt. Kanlaon Natural Park

However, in Mt. Kanlaon Natural Park there were four restricted range species of birds (White-winged Cuckooshrike, Visayan Hornbill, Visayan Flowerpecker and Flame-templed Babbler) observed and recorded from eleven surveyed trails in identified sites in the area. During the survey, a typhoon struck Visayas and the activity was greatly affected as it brought heavy rains and thick fogs making the birds harder to observe and locate.

Northern Negros Natural Park

Being the largest forest block in the whole island, Northern Negros Natural Park holds the most numbers of recorded individuals, Philippine endemic and West Visayan restricted range species of birds. The five identified restricted range species (White-winged Cuckooshrike, Grey-breasted Brown Dove, Visayan Hornbill, Visayan Flowerpecker and Flame-templed Babbler) were recorded during the survey. Also, the critically endangered Rufous-headed Hornbill was heard in Victorias City in NNNP. This species of bird is very sensitive to its environment and strict when it comes to selecting habitat as it prefers a mature and old growth primary forests in lower elevations. Given the limited forest cover of Negros Island and majority are in higher elevations these species cannot thrive. However, in NNNP there are still remaining lowland forests and most of it is part of the political jurisdiction of Cadiz City but due to the insurgency in Cadiz, Calatrava, Sagay and Toboso the establishment of permanent transects and actual count was put on hold.

All of these observations showed that Negros Island is rich in biodiversity and high endemism but the habitats of these wildlife species are slowly diminishing and reduced from 95% from 16th century to 4% in late 20th century (Heaney, *et al.*, 1998; Turner *et al.*, 2001) largely due to heavy loggings and agricultural expansion which started in the early 1970's (Paguntalan, 2003).

Citizen Scientists Participation

The three terrestrial protected areas in Negros hosts some of the most globally threatened species that are found nowhere else. The conduct of the synchronized BMS and hornbill count was participated by volunteers-trained and untrained from all over the island which resulted to a successful monitoring and data gathering. More priority sites were surveyed and marked permanently for future monitorings and there is less possibility of double counting since the activity was done simultaneously. Each group was led by biologists from PBCFI and DENR personnel who underwent Evidence-based Biodiversity Monitoring System training conducted for the three protected areas.

This activity is first in the country and is replicable in every region that needs biological baseline information on biodiversity more importantly on the avifauna species. Working together in partnership with different sectors unifies resources, provides a deeper pool of perspective and expertise and promotes sustainability of the activity. Information gathered will then be a significant input towards the better understanding of the species, stronger protection of their habitat and enhanced management of the sites.

RECOMMENDATIONS

Sustaining Biomonitoring activities

Additional transect establishment in unidentified areas where priority species occur – There is a need to establish additional transects in other important sites within the three protected areas to achieve a better assessment of the birds' population and distribution.

Synchronized BMS and Hornbill Count should be conducted during weekends so that more volunteers from academes and other institutions can participate and aid in the actual count.

Mainstreaming of the activity in the different LGUs for sustainability and support for logistics, manpower and other resources.

Analysis of Results

Elevation gradient plays a crucial role in every species in an area since others prefer lower elevation and other species prefer higher elevation due to the availability of food, habitat

preferences and the levels of threats. Weather can also affect population of bird species in the wild as most forest birds avoid getting wet and cold.

Regular bio-monitoring of forest guards with monthly reports (MKGB and BBB) – they should continue to conduct the bio-monitoring using hornbills as indicator species. This should be incorporated in the monthly reports for submission to ENROs and Protected Area Management Boards.

Sharing of Information: Translating Science to Conservation Action

Conservation education and advocacy – there is a need to regularly conduct conservation awareness activities for local communities to heightened understanding on the importance of biodiversity.

Formal studies on the ecology and population status of the endemic and threatened wildlife in Negros is still scanty and further studies are needed.

ENCOURAGING CITIZEN SCIENTISTS PARTICIPATION

A. Align with volunteer tourism activities/ events

Volunteers who participated in this activity were capacitated which can lead to a more sustained service in the future.

B. Partnership with local adventure groups

Working with a local adventure groups means more flexibility. Since there is a strong desire and common interests in protecting the environment as well as exploring the area the result would be massive and the benefits will flow back to the local community.

C. Green passport in PAs

- a. PA Office issues certificate of participation to participants. After at least three participations; one is eligible to apply for a Green Passport issued by DENR PENRO or Regional Office.
- b. Holders of the Green passport will be given discounts on environmental fees every time he/she enters a government protected areas/landscapes.

- c. Green passport is renewable every three years. People would go back and help for a sustainable cause in the PA which is beneficial to the LGUs, since great numbers of volunteers are needed to monitor an area of more than 20,000 ha.

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APPENDIX

Appendix A

Checklist of Bird Species and its relative abundance recorded in Mt. Guinsawan in Balinsasayao Twin Lakes Natural Park on June 1, 2017. Note *-Philippine Endemic Species; **-West Visayan Restricted Range Species

SPECIES	Relative Abundance (%)
DOVES and PIGEONS	
Buff-eared Brown Dove <i>Phapitreron nigrorum</i> *	2 (2.8)
Black-chinned Fruit Dove <i>Ramphiculus leclancheri</i> *	3 (4.2)
Philippine Cuckoo-dove <i>Macropygia tenuirostris</i> *	9 (12.5)
Common Emerald Dove <i>Chalcophaps indica</i>	1 (1.4)
CUCKOOS	
Brush Cuckoo <i>Cacomantis variolosus</i>	6 (8.3)
Philippine Hawk-cuckoo <i>Hierococcyx pectoralis</i> *	1 (1.4)
CUCKOO-SHRIKES	
White-winged cuckoo shrike <i>Coracina ostenta</i> **	3 (4.2)
Visayan Cuckooshrike <i>Coracina panayensis</i> **	2 (2.8)
HORNBILLS	
Visayan Hornbill <i>Penelopides panini</i> **	1 (1.4)
ORIOLES	
Black-naped Oriole <i>Oriolus chinensis</i>	2 (2.8)
BULBULS	
Visayan Bulbul <i>Hypsipetes guimarasensis</i> **	3 (4.2)
WHITE-EYES	
Yellowish White-eye <i>Zosterops nigrorum</i> *	1 (1.4)
Mountain White-eye <i>Zosterops montanus</i>	10 (13.9)
LEAF-WARBLERS	1 (1.4)
Mountain Leaf Warbler <i>Phylloscopus trivirgatus</i>	1 (1.4)
NUTHATCHES	
Sulphur-billed Nuthatch <i>Sitta oenochlamys</i> *	3 (4.2)
DRONGOS	
Balicassiao <i>Dicrurus balicassius</i> *	1 (1.4)
CISTICOLAS and ALLIES	
Chestnut-crowned Tailorbird <i>Orthotomus castaneiceps</i> **	1 (1.4)
STARLINGS and MYNAS	
Coleto <i>Sarcops calvus</i> *	2 (2.8)
TITS	
Elegant Tit <i>Pardaliparus elegans</i> *	1 (1.4)
FLYCATCHERS, FANTAILS and MONARCHS	
Visayan Fantail <i>Rhipidura albiventris</i> **	1 (1.4)
Visayan Shama <i>Kittacincla supercilialis</i> **	1 (1.4)
WHISTLERS	
White-vented Whistler <i>Pachycephala homereyi</i> *	1 (1.4)

SPECIES	Relative Abundance (%)
FLOWERPECKERS	
Orange-bellied Flowerpecker <i>Dicaeum trigonostigma</i>	7 (9.7)
Fire-breasted Flowerpecker <i>Dicaeum ignipectus</i>	1 (1.4)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **	5 (6.9)
WOODPECKERS	
Philippine Pygmy Woodpecker <i>Picoides maculatus</i> *	2 (2.8)
RHABDORNIS	
Stripe-breasted Rhabdornis <i>Rhabdornis inornatus</i> *	1 (1.4)
Total number of individuals	72
Total number of species	26
Total number of Philippine endemic species	20
Total number of Restricted Range species	8

Appendix B

Checklist of Bird Species and its relative abundance recorded in Mt. Kanlaon Natural Park on June 9, 2017.

Note *-Philippine Endemic Species; **-West Visayan Restricted Range Species

SPECIES	BC	M	LCC	LC	SCC	CC	TOTAL
PHEASANTS and ALLIES							
Red Junglefowl <i>Gallus gallus</i>						3 (1.2)	3 (0.5)
HAWKS, EAGLES							
Philippine Serpent Eagle <i>Spilornis holospilus</i> *		+					+
Brahminy Kite <i>Haliastur indus</i>					+		+
DOVES and PIGEONS							
Buff-eared Brown Dove <i>Phapitreron nigrorum</i> *	2 (2.5)	2 (2.6)	3 (5.0)	4 (12.5)	4 (2.6)	5 (2.1)	20 (3.1)
Black-chinned Fruit Dove <i>Ramphiculus leclancheri</i> *	1 (1.3)			4 (12.5)		1 (0.4)	6 (0.9)
Philippine Cuckoo-dove <i>Macropygia tenuirostris</i> *		+	1 (1.7)		1 (0.7)	9 (3.7)	11 (1.7)
Common Emerald Dove <i>Chalcophaps indica</i>		1 (1.3)	1 (1.7)		3 (2.0)		5 (0.8)
Yellow-breasted Fruit Dove <i>Ramphiculus occipitalis</i> *			1 (1.7)		1 (0.7)	1 (0.4)	3 (0.5)
Green Imperial Pigeon <i>Ducula aenea</i>		1 (1.3)			1 (0.7)		2 (0.3)
Metallic Pigeon <i>Columba vitiensis</i>			9 (15.0)				9 (1.4)
Pink-bellied Imperial Pigeon <i>Ducula poliocephala</i> *	1 (1.3)	+					1 (0.2)
CUCKOOS							
Philippine Coucal <i>Centropus viridis</i> *				1 (3.1)	3 (2.0)		4 (0.6)
Brush Cuckoo <i>Cacomantis variolosus</i>	1 (1.3)					6 (2.5)	7 (1.1)
Plaintive Cuckoo <i>Cacomantis merulinus</i>		+				2 (0.8)	2 (0.3)
Rusty-breasted Cuckoo <i>Cacomantis sepulchralis</i>	3 (3.8)				5 (3.3)		8 (1.2)
Philippine Hawk-cuckoo <i>Hierococcyx pectoralis</i> *					1 (0.7)	1 (0.4)	2 (0.3)
CUCKOO-SHRIKES							
White-winged cuckoo shrike <i>Coracina ostenta</i> **	+				2 (1.3)		2 (0.3)
Visayan Cuckooshrike <i>Coracina panayensis</i> **	1 (1.3)				4 (2.6)	6 (2.5)	11 (1.7)
KINGFISHERS							
Spotted Wood Kingfisher <i>Actenoides lindsayi</i> *		2 (2.6)			2 (1.3)		4 (0.6)
SPECIES	BC	M	LCC	LC	SCC	CC	TOTAL

Dimorphic Dwarf Kingfisher <i>Ceyx margarethae</i>	2 (2.5)						2 (0.3)
HORNBILLS							
Visayan Hornbill <i>Penelopides panini</i> **		+			1		1 (0.2)
BULBULS							
Visayan Bulbul <i>Hypsipetes guimarasensis</i> **	2 (2.5)	21 (27.6)	3 (5.0)	4 (12.5)	11 (7.2)	15 (6.2)	56 (8.7)
WHITE-EYES							
Yellowish White-eye <i>Zosterops nigrorum</i> *		1 (1.3)				45 (18.6)	46 (7.2)
Mountain White-eye <i>Zosterops montanus</i>	32 (40.5)	7 (9.2)	23 (38.3)	7 (21.9)	20 (13.1)	74 (30.6)	163 (25.4)
LEAF-WARBLEDERS							
Lemon-throated Leaf Warbler <i>Phylloscopus cebuensis</i> *	1 (1.3)	1 (1.3)				3 (1.2)	5 (0.8)
Mountain Leaf Warbler <i>Phylloscopus trivirgatus</i>					7 (4.6)		7 (1.1)
NUTHATCHES							
Sulphur-billed Nuthatch <i>Sitta oenochlamys</i> *	3 (3.8)		6 (10)		2 (1.3)		11 (1.7)
DRONGOS							
Balicassiao <i>Dicrurus balicassius</i> *	14 (17.7)	12 (15.8)		3 (9.4)	10 (6.5)		39 (6.1)
CISTICOLAS and ALLIES							
Chestnut-crowned Tailorbird <i>Orthotomus castaneiceps</i> **		6 (7.9)		4 (12.5)	5 (3.3)	4 (1.7)	19 (3.0)
STARLINGS and MYNAS							
Coledo <i>Sarcops calvus</i> *	4 (5.1)	7 (9.2)	2 (3.3)		16 (10.5)	7 (2.9)	36 (5.6)
TITS							
Elegant Tit <i>Pardaliparus elegans</i> *	1 (1.3)	+	3 (5.0)	1 (3.1)	7 (4.6)	1 (0.4)	13 (2.0)
FAIRY FLYCATCHERS							
Citrine Canary Flycatchers <i>Culicicapa helianthea</i>					1 (0.7)		1 (0.2)
FLYCATCHERS, FANTAILS and MONARCHS							
Visayan Fantail <i>Rhipidura albiventris</i> **	3 (3.8)	2 (2.6)	3 (5.0)		12 (7.8)	5 (2.1)	25 (3.9)
Visayan Shama <i>Kittacincla superciliaris</i> **		1 (1.3)		1 (3.1)	2 (1.3)	11 (4.5)	15 (2.3)
Pied Fantail <i>Rhipidura javanica</i>							
White-throated Jungle Flycatcher <i>Rhinomyias albigularis</i> **		1 (1.3)					1 (0.2)
Mangrove Blue Flycatcher <i>Cyornis rufisgastra</i>				1 (3.1)			1 (0.2)
Island Verditer Flycatcher <i>Eumyias panayensis</i>					2 (1.3)		2 (0.3)
ORIOLES							
Black-naped Oriole <i>Oriolus chinensis</i>		1 (1.3)				1 (0.4)	
WHISTLERS							
White-vented Whistler <i>Pachycephala homereyi</i> *					3 (2.0)	3 (1.2)	6 (0.9)
FLOWERPECKERS							
Orange-bellied Flowerpecker <i>Dicaeum trigonostigma</i>	2 (2.5)	2 (2.6)			10 (6.5)	5 (2.1)	19 (3.0)
Fire-breasted Flowerpecker <i>Dicaeum ignipectus</i>		1 (1.3)	3 (5.0)		4 (2.6)	6 (2.5)	14 (2.2)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **	2 (2.5)	1 (1.3)				1 (0.4)	4 (0.6)
Pygmy Flowerpecker <i>Dicaeum pygmaeum</i> *						2 (0.8)	2 (0.3)
SUNBIRDS							
Olive-backed Sunbird <i>Nectarinia jugularis</i>		2 (2.6)			5 (3.3)		7 (1.1)
Maroon-naped Sunbird <i>Aethopyga flagrans</i> *				1 (3.1)			1 (0.2)
WOODPECKERS							

SPECIES	BC	M	LCC	LC	SCC	CC	TOTAL
Philippine Pygmy Woodpecker <i>Picoides maculatus</i> *	1 (1.3)	+	2 (3.3)	1 (3.1)	1 (0.7)	3 (1.2)	8 (1.2)
PARROTS							
Blue-naped Parrot <i>Tanygnathus lucionensis</i> *	1 (1.3)				1 (0.7)		2 (0.3)
Blue-crowned Racquet-tail <i>Prioniturus discurus</i> *	1 (1.3)	+			4 (2.6)		5 (0.8)
Colasisi <i>Loriculus philippensis</i> *						2 (0.8)	2 (0.3)
THRUSHES							
Island Thrush <i>Turdus poliocephalus</i>						19 (7.9)	19 (3.0)
BABBLERS							
Flame-templed Babbler <i>Dasycrotapha speciosa</i> **		3 (3.9)					3 (0.5)
ASIAN BARBETS							
Coppersmith Barbet <i>Psilopogon haemacephalus</i>		+					+
TRILLERS							
Pied Triller <i>Lalage nigra</i>						1 (0.4)	1 (0.2)
SHORTWINGS							
White-browed Shortwing <i>Brachypteryx montana</i>	1 (1.3)	1 (1.3)			2 (1.3)		4 (0.6)
Total number of individuals	79	76	60	32	153	242	642
Total number of species	22	31	13	12	32	27	55
Total number of Philippine endemic species	16	20	9	10	20	19	33
Total number of Restricted Range species	5	8	2	3	6	6	10

Legend: BC-Bago City; M-Murcia; LCC-La Carlota City; LC-La Castellana; SCC-San Carlos City; CC-Canlaon City

Appendix C

Checklist of Bird Species and its relative abundance recorded in Northern Negros Natural Park on June 20, 2017.

Note *-Philippine Endemic Species; **-West Visayan Restricted Range Species

SPECIES	TC	SC	EBM	VC	M	DSB	SCC	TOTAL
PHEASANTS and ALLIES								
Red Junglefowl <i>Gallus gallus</i>	1 (0.9)		1 (1.6)	4 (0.9)	1 (0.6)	1 (0.06)	1 (2.4)	9 (0.8)
HAWKS, EAGLES								
Philippine Serpent Eagle <i>Spilornis holospilus</i> *		+		+				+
Brahminy Kite <i>Haliastur indus</i>	+				+	+		+
Philippine Hawk Eagle <i>Niseatus philippensis</i> *				+		+		+
DOVES and PIGEONS								
Buff-eared Brown Dove <i>Phapitreron nigrorum</i> *	5 (4.6)	3 (2.3)	5 (8.2)	22 (5.2)	5 (3.2)	9 (5.5)	5 (11.9)	54 (5.0)
Black-chinned Fruit Dove <i>Ramphiculus leclancheri</i> *				1 (0.2)				1 (0.09)
Philippine Cuckoo-dove <i>Macropygia tenuirostris</i> *	1 (0.9)	2 (1.5)		6 (1.4)		2 (1.2)		11 (1.0)
Common Emerald Dove <i>Chalcophaps indica</i>	2 (1.9)	1 (0.8)		5 (1.2)	1 (0.6)			9 (0.8)
Grey-breasted Brown Dove <i>Phapitreron amethystinus</i> **				1 (0.2)				1 (0.09)
Yellow-breasted Fruit Dove <i>Ramphiculus occipitalis</i> *		1 (0.8)	2 (3.3)	1 (0.2)	2 (1.3)	1 (0.6)		7 (0.6)
Green Imperial Pigeon <i>Ducula aenea</i>		3 (2.3)	3 (4.9)	1 (0.2)		9 (5.5)		16 (1.5)
Metallic Pigeon <i>Columba vitiensis</i>	1 (0.9)	1 (0.8)						2 (0.2)
Pink-bellied Imperial Pigeon <i>Ducula poliocephala</i> *		4 (3.0)	1 (1.6)	3 (0.7)				8 (0.7)

SPECIES	TC	SC	EBM	VC	M	DSB	SCC	TOTAL
CUCKOOS								
Philippine Coucal <i>Centropus viridis</i> *			1 (1.6)		1 (0.6)		10 (23.8)	12 (1.1)
Brush Cuckoo <i>Cacomantis variolosus</i>		8 (6.0)	6 (9.8)	13 (3.1)	1 (0.6)	5 (3.0)		33 (3.0)
Plaintive Cuckoo <i>Cacomantis merulinus</i>					1 (0.6)			1 (0.09)
Philippine Hawk-cuckoo <i>Hierococcyx pectoralis</i> *			3 (4.9)		2 (1.3)			5 (0.5)
CUCKOO-SHRIKES								
White-winged cuckoo shrike <i>Coracina ostenta</i> **				4 (0.9)		9 (5.5)		13 (1.2)
Visayan Cuckooshrike <i>Coracina panayensis</i> **		9 (6.8)	2 (3.3)	3 (0.7)	18 (11.7)			32 (2.9)
KINGFISHERS								
Spotted Wood Kingfisher <i>Actenoides lindsayi</i> *				2 (0.5)	1 (0.6)		4 (9.5)	7 (0.6)
HORNBILLS								
Visayan Hornbill <i>Penelopides panini</i> **		1 (0.8)	3 (4.9)	11 (2.6)	2 (1.3)	3 (1.8)		20 (1.8)
Rufous-headed Hornbill <i>Rhabdorrhinus waldeni</i> **				+				+
BULBULS								
Visayan Bulbul <i>Hypsipetes guimarasensis</i> **	15 (13.9)	20 (15.0)	10 (16.4)	80 (18.8)	14 (9.1)	31 (18.8)	8 (19.0)	178 (16.3)
Yellow-vented Bulbul <i>Pycnonotus goiavier</i>							2 (4.8)	2 (0.2)
WHITE-EYES								
Yellowish White-eye <i>Zosterops nigrorum</i> *			5 (8.2)	38 (8.9)	16 (10.4)	3 (1.8)		62 (5.7)
Mountain White-eye <i>Zosterops montanus</i>	35 (32.4)	30 (22.6)		11 (2.6)		18 (10.9)		94 (8.6)
LEAF-WARBLERS								
Arctic Warbler <i>Phylloscopus borealis</i>	1 (0.9)		1 (1.6)					2 (0.2)
Lemon-throated Leaf Warbler <i>Phylloscopus cebuensis</i> *		1 (0.8)	1 (1.6)	9 (2.1)		3 (1.8)		14 (1.3)
Mountain Leaf Warbler <i>Phylloscopus trivirgatus</i>	2 (1.9)	2 (1.5)		1 (0.2)				5 (0.5)
NUTHATCHES								
Sulphur-billed Nuthatch <i>Sitta oenochlamys</i> *	6 (5.6)			6 (1.4)	2 (1.3)	4 (2.4)		18 (1.7)
BEE-EATERS								
Blue-tailed Bee-eater <i>Merops philippinus</i>			1 (1.6)					1 (0.09)
DRONGOS								
Balicassiao <i>Dicrurus balicassius</i> *	1 (0.9)	6 (4.5)	4 (6.6)	28 (6.6)	3 (1.9)	7 (4.2)		49 (4.5)
CISTICOLAS and ALLIES								
Philippine Tailorbird <i>Orthotomus castaneiceps</i> *	10 (9.3)							10 (0.9)
Grey-capped tailorbird <i>Orthotomus derbianus</i> **		2 (1.5)	3 (4.9)	13 (3.1)	5 (3.2)	8 (4.8)	7 (16.7)	38 (3.5)
CROWS								
Large-billed Crow <i>Corvus macrorhynchos</i>				+				+
STARLINGS and MYNAS								
Coleto <i>Sarcops calvus</i> *	5 (4.6)	13 (9.8)		22 (5.2)	25 (16.2)	12 (7.3)		77 (7.1)
Stripe-sided Rhabdornis <i>Rhabdornis mystacalis</i> *				6 (1.4)				6 (0.6)
Crested Myna <i>Acridotheres cristatellus</i>				1 (0.2)				1 (0.09)
TITS								
Elegant Tit Pardaliparus elegans*	4 (3.7)		3 (4.9)	16 (3.8)		7 (4.2)		30 (2.8)
FAIRY FLYCATCHERS								
Citrine Canary Flycatchers <i>Culicicapa helianthea</i>				12 (2.8)				12 (1.1)

SPECIES	TC	SC	EBM	VC	M	DSB	SCC	TOTAL
FLYCATCHERS, FANTAILS and MONARCHS								
Visayan Fantail <i>Rhipidura albiventris</i> **		4 (3.0)	1 (1.6)	35 (8.2)	7 (4.5)	4 (2.4)		51 (4.7)
Visayan Shama <i>Kittacincla superciliaris</i> **	5 (4.6)				6 (3.9)	5 (3.0)	5 (11.9)	21 (1.9)
Pied Fantail <i>Rhipidura javanica</i>						2 (1.2)		2 (0.2)
Southern Rufous Paradise Flycatcher <i>Terpsiphone cinnamomea</i> *	5 (4.6)							5 (0.5)
Island Verditer Flycatcher <i>Eumyias panayensis</i>	1 (0.9)							1 (0.09)
White-throated Jungle Flycatcher <i>Rhinomyias albigularis</i> **		4 (3.0)	1 (1.6)	35 (8.2)	7 (4.5)	4 (2.4)		51 (4.7)
Little Pied Flycatcher <i>Ficedula westermanni</i>						2 (1.2)		2 (0.2)
WHISTLERS								
White-vented Whistler <i>Pachycephala homereyi</i> *				3 (0.7)		1 (0.6)		4 (0.4)
FLOWERPECKERS								
Orange-bellied Flowerpecker <i>Dicaeum trigonostigma</i>		4 (3.0)		9 (2.1)	4 (2.6)	9 (5.5)		26 (2.4)
Fire-breasted Flowerpecker <i>Dicaeum ignipectus</i>		1 (0.8)		1 (0.2)	7 (4.5)	2 (1.2)		11 (1.0)
Visayan Flowerpecker <i>Dicaeum haematostictum</i> **		2 (1.5)	2 (3.3)	8 (1.9)	4 (2.6)	1 (0.6)		17 (1.6)
Bicolored Flowerpecker <i>Dicaeum bicolor</i> *		1 (0.8)		1 (0.2)				2 (0.2)
Pygmy Flowerpecker <i>Dicaeum pygmaeum</i> *		5 (3.8)		3 (0.7)				8 (0.7)
SUNBIRDS								
Olive-backed Sunbird <i>Nectarinia jugularis</i>				2 (0.5)	2 (1.3)	1 (0.6)		5 (0.5)
Magnificent Sunbird <i>Aethopyga magnifica</i> *		2 (1.5)	2 (3.3)		1 (0.6)			5 (0.5)
Maroon-naped Sunbird <i>Aethopyga flagrans</i> *				3 (0.7)				3 (0.3)
WOODPECKERS								
Philippine Pygmy Woodpecker <i>Picoides maculatus</i> *		+		3 (0.7)	5 (3.2)			8 (0.7)
White-bellied Woodpecker <i>Dryocopus javensis</i>		3 (2.3)			2 (1.3)			5 (0.5)
Yellow-faced Flameback <i>Chrysocolaptes xanthocephalus</i> **				1 (0.2)				1 (0.09)
PARROTS								
Blue-crowned Racquet-tail <i>Prioniturus discurus</i> *				1 (0.2)	6 (3.9)	1 (0.6)		8 (0.7)
THRUSHES								
Island Thrush <i>Turdus poliocephalus</i>	8 (7.4)							8 (0.7)
BABBLERS								
Flame-templed Babbler <i>Dasycrotapha speciosa</i> **				1 (0.2)	3 (1.9)			4 (0.4)
SHORTWINGS								
White-browed Shortwing <i>Brachypteryx montana</i>						1 (0.6)		1 (0.09)
Total number of individuals	108	133	61	426	154	165	42	1,089
Total number of species	19	28	22	45	30	31	8	63
Total number of Philippine endemic species	10	19	17	32	21	20	6	39
Total number of Restricted Range species	2	7	7	11	7	8	3	13

Legend: TC-Talisay City; SC-Silay City; EBM-E.B. Magalona; VC-Victorias City; M-Murcia; DSB-Don Salvador Benedicto; SCC-San Carlos City